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Comet West: A View From The HELIOS Zodiacal Light Photometers

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Comet West passed through perihelion on February 25, 1976. The comet crossed the HELIOS A and B spacecraft zodiacal light photometer fields of view as the spacecraft orbited the Sun, allowing them to record the brightness, polarization, and color of the comet and its surrounding interplanetary medium. Data from the U, B, and V photometers across the tail shows a distinct bluing followed by a slight reddening corresponding to the ion and dust tails, respectively, entering the field of view. The non-Earth perspective of the HELIOS photometers allows a comparison of the tail with Earth observations at the same time. Precise location of the nucleus and tail allow the photometer data to be searched for evidence of the comet bow shock and orbital dust. A brightness "bump" present in the data before the comet reaches some photometer positions, can be shown to approximately form a parabolic shape sunward and ahead of the orbital motion of the Comet West nucleus. If this is the comet bow shock or bow compression, then it corresponds to a density enhancement of the ambient medium by 1.5 to 2 times in the vicinity of the comet. The distance of the brightness increase from the nucleus by comparison with Comet Halley implies a neutral gas production rate of approximately 3 times that of Halley.